Service Area Accessibility for Workers in Ramsey County

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in GEOG 5564: Urban Geographic
Information Science and Analysis

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RAMSEY COUNTY

Resilient Communities Project
University of Minnesota
Building community-university partnerships for sustainability

The project on which this report is based was completed in collaboration with Ramsey County as part of the 2018–2019 Resilient Communities Project (RCP) partnership. RCP is a program at the University of Minnesota's Center for Urban and Regional Affairs (CURA) that connects University faculty and students with Minnesota communities to address strategic projects that advance local resilience and sustainability.

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Service Area for Workers in Ramsey County: Final Report

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Introduction

Ramsey County Workforce Solutions provides personal workforce development assistance in hope of enhancing the viability and success of its workers. One of the largest barriers they have found in the ability for people to find and keep jobs is transportation, stemming directly from a lack of vehicle ownership and satisfactory public transportation access. Because of this, Ramsey County was looking to understand accessibility of job centers from areas across the county. Through use of publicly available data, a service area was run to clearly visualize the distance around job centers that can be reached within 30 minutes on the street level, providing Ramsey County with the information they need to implement possible changes.

Objective

Through completion of this project, we aim to have computed and created a visual representation to help Ramsey County identify solutions to perceived problems, leading to an increase of accessibility to job centers in the county. The created map and computed data highlighted specific areas that require better access through transportation. Visualizing areas with little service with those of high poverty rates, later to be replaced with unemployment rates, will assist in understanding a possible correlation or causal relationship between the two.

Data and Methods

Data was collected from a number of publicly available sources in addition to those provided by Dr. Ying Song. 2017 General Transit Feed Specifications data was used to create transit lines and stops using the Generate Transit Lines and Stops tool in ArcGIS. It was then combined with 2017 pedestrian data from Minnesota Geospatial Commons using the Generate Stop-Street Connectors tool. This aggregated data produced city bus, light rail, and commuter rail departure times, transit line direction and transit line frequency. The combined data used a template from the 2017 GTFS data to create a network dataset using the Create Network Dataset tool, then using the Build Network tool and Get Network EID tool to finish creating the dataset which was added as a layer to the map. Data used was those only collected from 6AM to 9AM, chosen to represent the average daily AM rush.

MetroGIS data was gathered from the MN Geospatial website to complement the new transit network dataset. This included job center locations based on the 2010 census. Transit line headways data was collected from January 2019. Finally, areas of concentrated poverty where more than 40 percent of its residents were under the national poverty line, based on the 2013-2017 five-year American Community Survey estimates. Job center data were given as

polygons which were converted to points, which were in the geographic center of the polygons, in order to run the service area. This was done through the use of the Feature to Point tool, and is displayed as graduated symbols to represent four groups of increasing numbers of jobs in that center. While the project was only focused on employees in Ramsey County, data was gathered from outside the county boundary to account for workers who commute from outside the county lines.

At the start of research, our group was also provided with Workforce Solution heat maps generated by Ramsey County that show density of Workforce Solution client locations. Along with these maps we were asked to focus on some specific neighborhoods that had particularly high concentrations of participants. Because of this, we inquired further on the three neighborhoods of Frogtown, Larpentuer and Rice, and Roosevelt Homes in addition to the county as a whole. On the poster there are large scale captures of each of these neighborhoods and their accessibility through public transportation in addition to shading signifying at least 40 percent of residents in poverty.

The job center point data was connected to the all bus stop within 500 meters using the Near tool. 500 meters was used because it is about five minutes walking distance, which is generally considered by transit experts the maximum that most people will walk regularly to a bus stop. Although only one point was used for the entire job center, this is meant to result in a more conservative estimate of service areas for job centers. It was done to avoid giving more weight to the fringe of job centers, and that the centered point data would better represent the service areas for residents. The distance could be modified for future analyses.

The network analyst extension was used to create a service area. The new transit network layer was input into the network analyst extension, then a new service area was created and added as a layer to the map. The job center points were then added to the service area as destination facilities to analyze AM rush hour service. The facilities service areas were allowed to overlap so that areas would be linked with their closest job center. Lines generated were not allowed to overlap and the network source field was included. This was to prevent the original desire lines (created in the Network Analysis) used to connect transit network stops would not be included in the service area map. The Solve tool on the network analysis extension was then used to compute the service area to be used for analysis.

Results

After analysis of the completed service area, it is clear there are areas with small range of accessibility within 30 minutes on public transportation, even in the downtown area. Nearly the entirety of the southwest corner of the county has access to a job center with downtown and along University and Summit Avenues showing the largest area of accessibility in under 15 minutes of travel. Job centers in the northern and easternmost areas have the smallest range of access, with some 30 minute commutes falling outside county lines. There is a significant amount of area with concentrated poverty and no access to job centers in under 30 minutes on the northern and eastern areas of St. Paul, including and especially in the Roosevelt Homes neighborhood. On the contrary, there are areas with extremely high accessibility that are also locations of high poverty. Some shaded areas engulf a job center themselves.

Conclusion

Visuals created by the service area tool provide great insight on potential solutions to lack of accessibility throughout parts of Ramsey County. To start, quicker forms of transportation to the northern job centers including the New Brighton industrial areas, the Maplewood Mall area, the I35W/US 10 area, the I694 corridor between Rice Street and Snelling Avenue, Highway 36/Rice Street area, I35E/County Road E area, and the Highway 65/73rd Avenue area is necessary. It is also important to increase accessibility through public transportation in areas of concentrated poverty in hopes of bringing job opportunity and lowering poverty rates. Areas in the Roosevelt Homes neighborhood and those in northern parts of the Frogtown neighborhood are in most need. Express lines, increase of limited stop services or extension of light rail to other directions of the county may prove beneficial in reaching more residents within 30 minutes.

Limitations and Future Research

One major limitation in our research was use of 2017 General Transit Feed Specifications data. Since time of data collection a few bus lines, including the 54, have been created or extended to areas showing no 30 minute accessibility. Had this data been newer, our results would have been much less limited in those areas. Additionally, altering job centers from polygons to points created a more conservative set of results. This means there is the possibility that more areas could be reached within 30 minutes of a job that is considered part of a job center, but exists away from the point we defined. Using individual points for locations of jobs would be much more accurate and would likely extend the range of accessibility. Another option is to create a larger buffer around job center points to increase the size of the area considered to have jobs. Not using polygons also made it difficult to weigh the amount of jobs in a given area, and job centers were equally weighted regardless of the amount of jobs. Lastly, use of unemployment data would help in understanding the true association between accessibility and unemployment rates rather than making assumptions based on concentrated poverty data.

A further area of study to increase accuracy is inclusion of job centers outside the county. We were able to account for a number of areas outside of the county lines where employees may live, but Ramsey County is also home to individuals who work in neighboring counties as well. It is understood that many areas in Minneapolis and other neighboring areas are within a 30 minute travel time, so interest in resident employment is key as well.